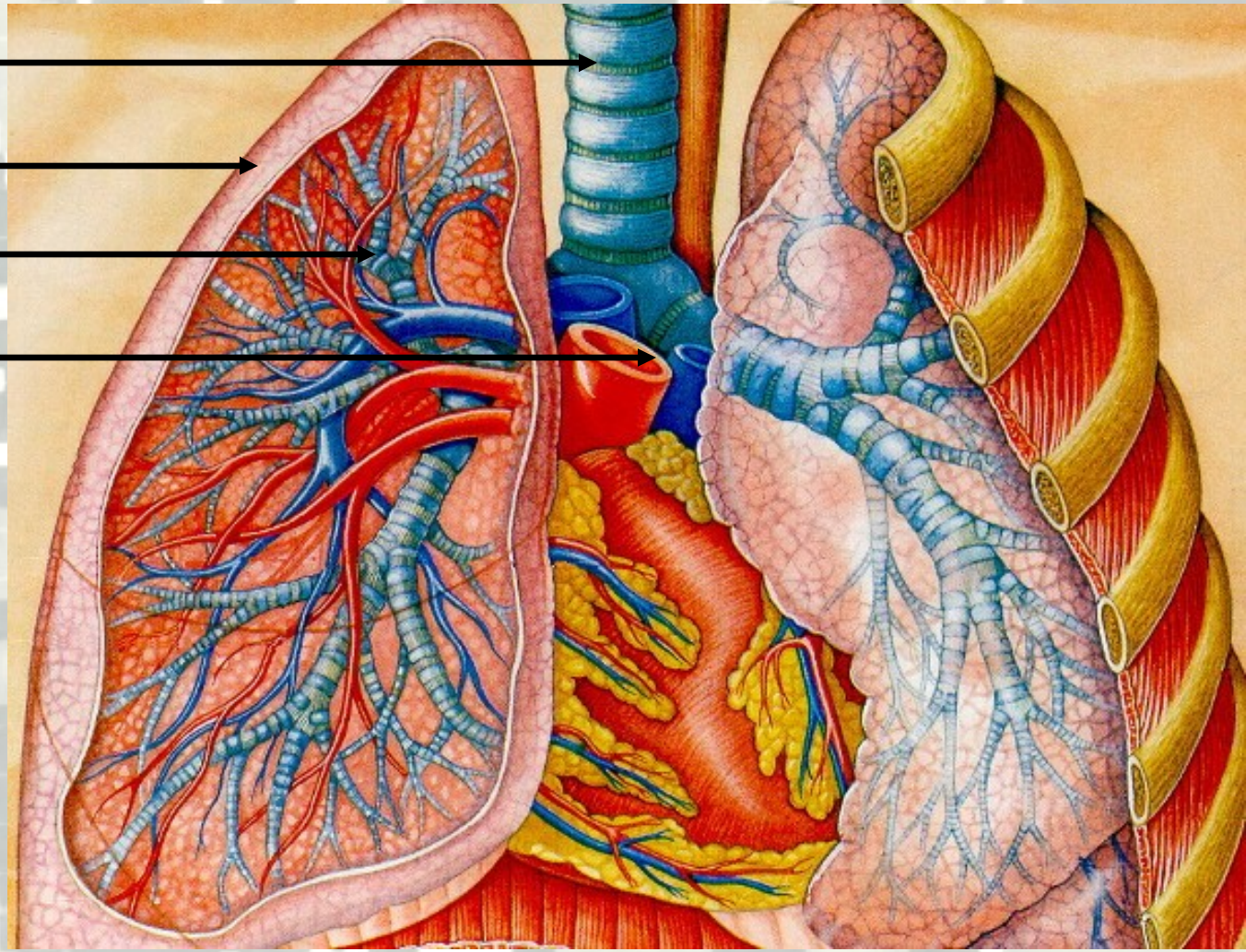
Treating Penetrating Chest Trauma and Decompressing a Tension Pneumothorax

Anatomy of the Thorax

- Trachea
- Lungs
- Bronchi
- Mediastinum



Introduction

- the body has two lungs, each enclosed in a separate airtight area within the chest. If a object punctures the chest wall and allows air to enter one of these areas, the lung within that area will begin to collapse.

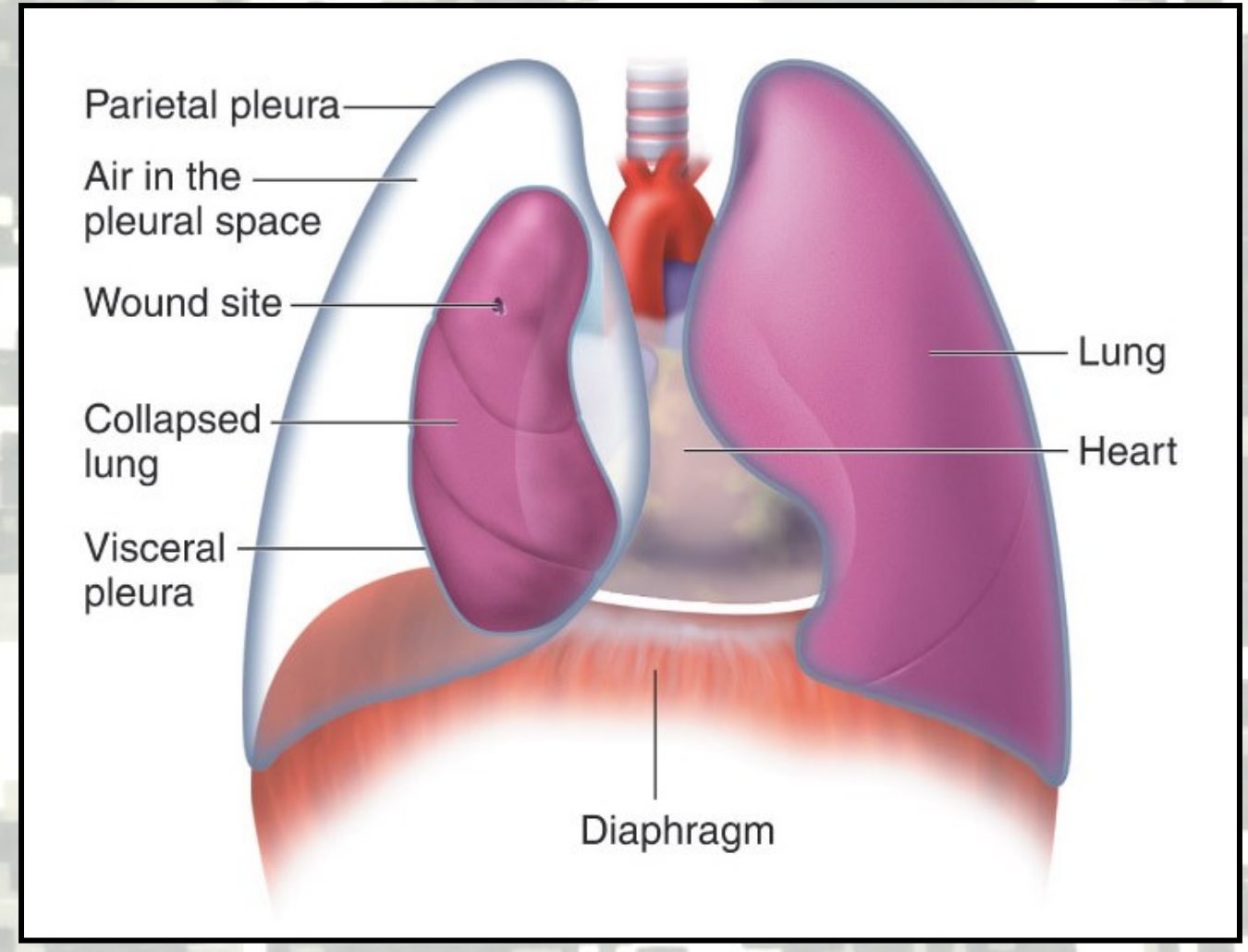
- any degree of collapse of either lung interferes with the casualty's ability to breath and reduces the amount of oxygen available for use by the body.

Open Chest Wound

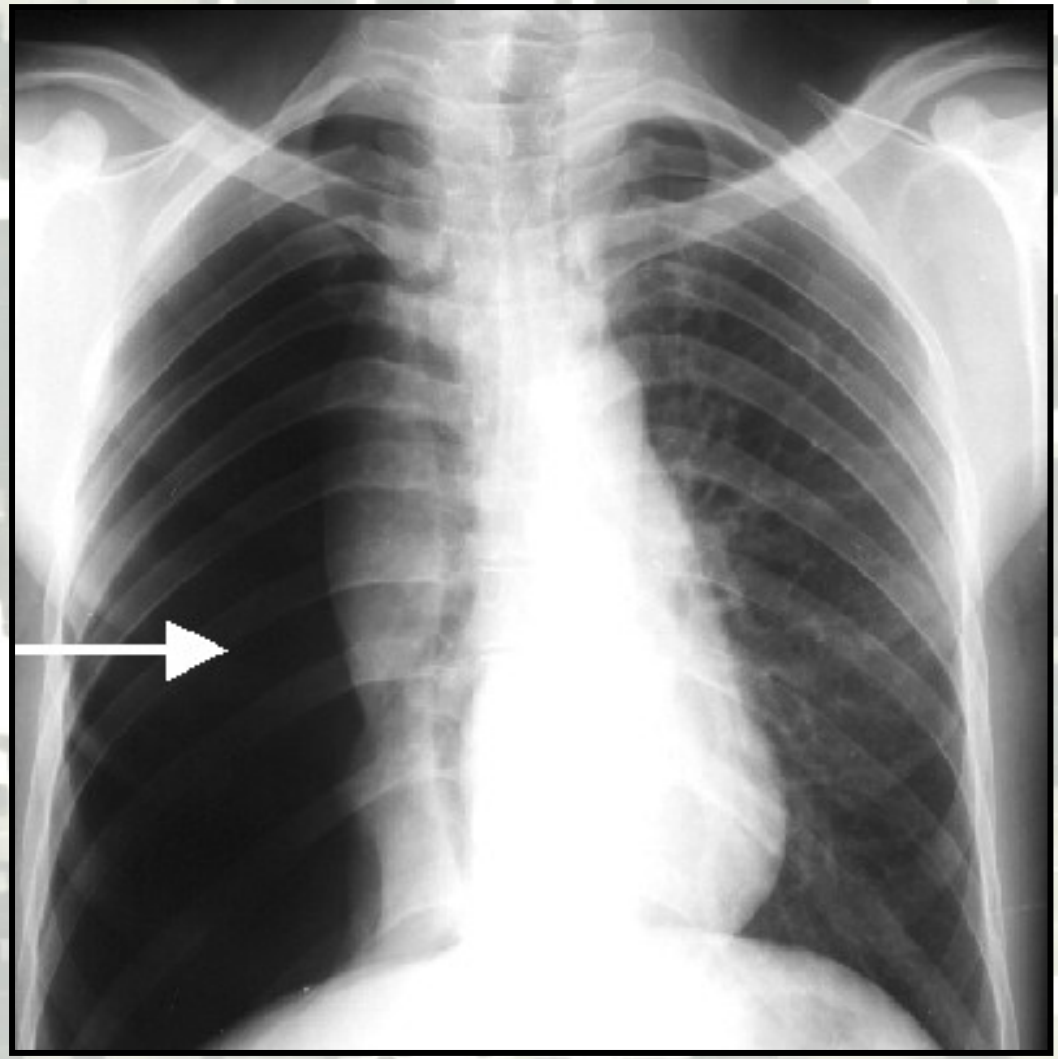
When an object penetrates the chest wall, the injury is called an open chest wound

- **bullet**
- **knife blade**
- **shrapnel**
- **stick**
- **blast debris**
- **rib**

Open Chest Wound



Open Chest Wound



Signs and Symptoms of an Open Chest Wound

- sucking or hissing sounds from wound “sucking chest wound”
- casualty coughing up blood
- frothy blood coming from wound
- shortness of breath / Difficulty breathing

Signs and Symptoms of an Open Chest Wound

- chest not rising normally during inhalation (fractured ribs, resulting in a flail chest)
- pain in shoulder or chest tha increases with breathing
- rapid and weak heartbeat (shock)
- bluish tint of lips, inside of mouth, fingertips, or nail beds caused by a decrease of oxygen in the blood (cyanosis)

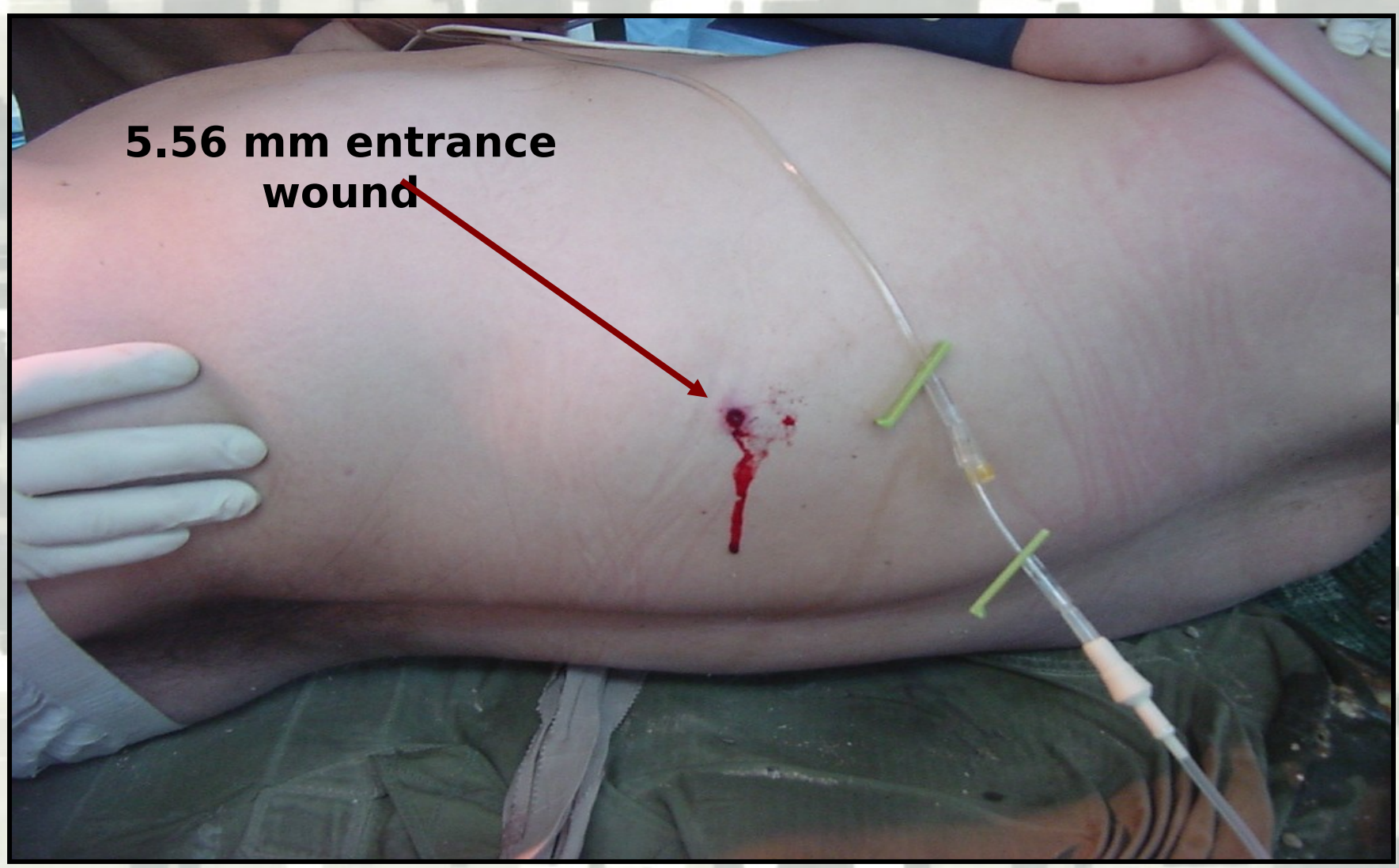
Expose the Wound

- **expose the wound by removing, cutting, or tearing the clothing covering the wound**
- **use scissors from aid bag, a knife , or a bayonet**
- **<u>do not</u> remove clothing stuck to the wound**
- **<u>do not</u> clean the wound or remove objects stuck in the wound**

Check for Open Chest Wounds

- locate the open chest wound
- check for entry and exit wound (look and feel)
- apply occlusive dressing to entry (three taped sides) and exit wounds (four taped sides)
- seal larger wound first

Open Chest Wound



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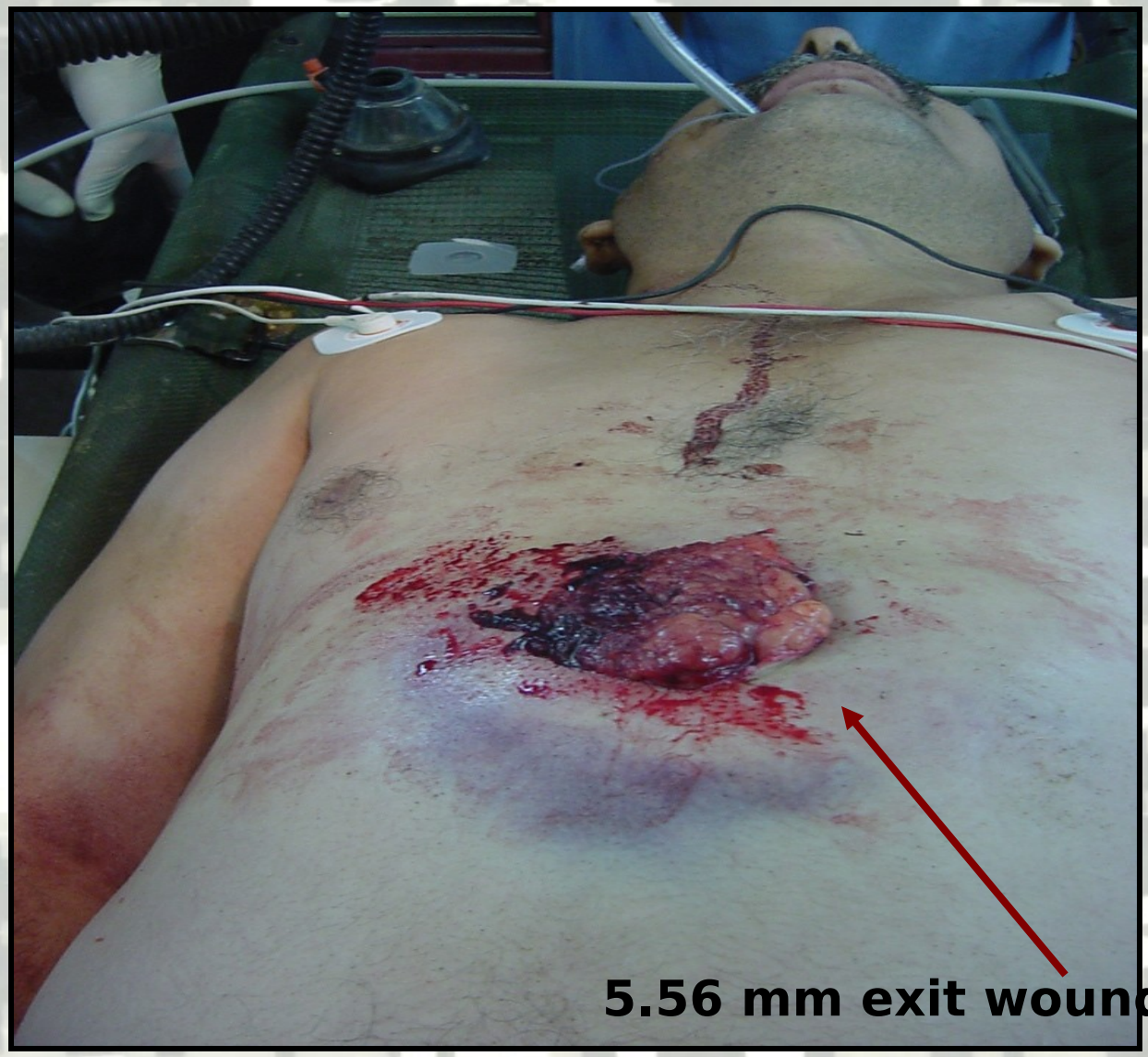
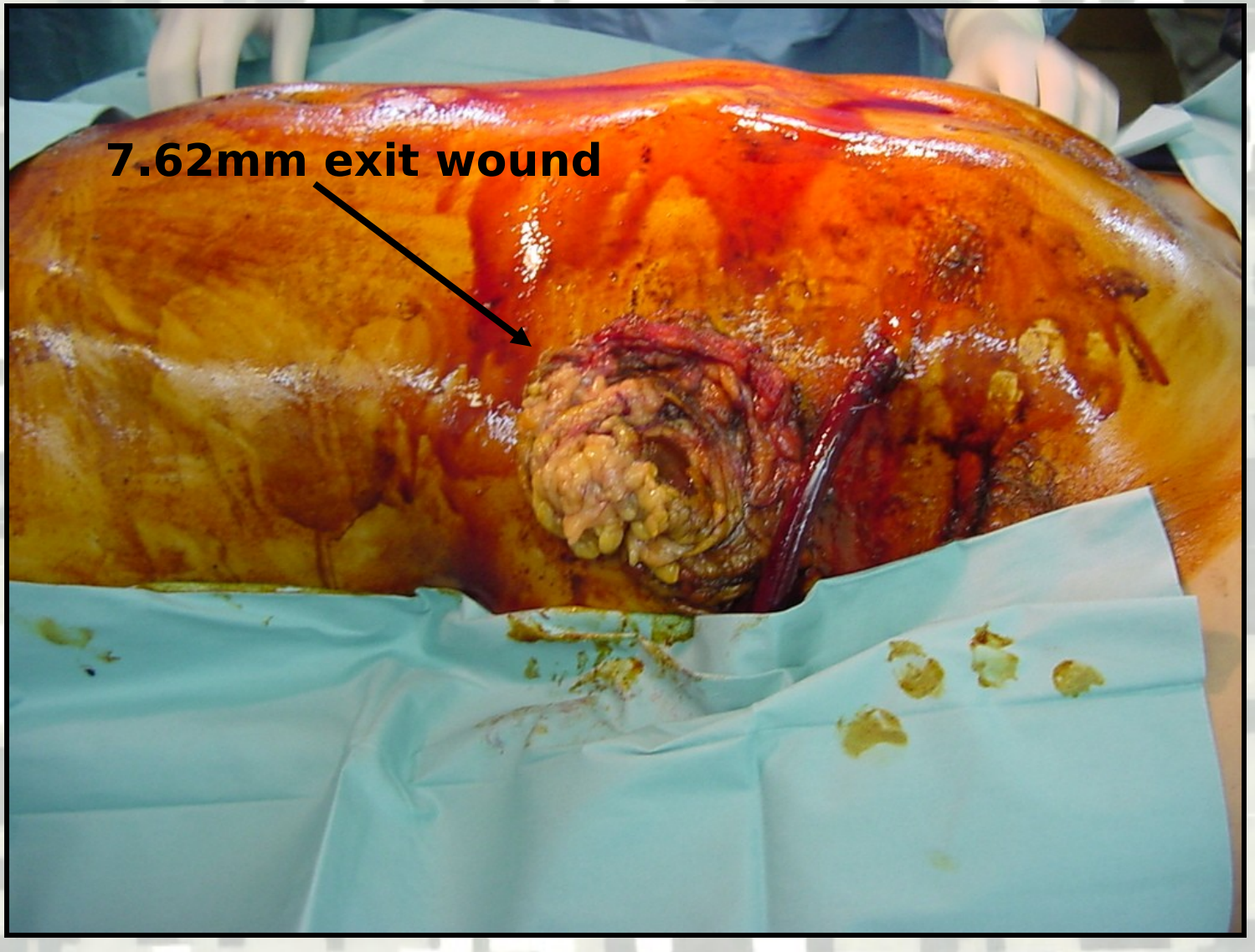


Open Chest Wound



Prepare Sealing Material

Since air can pass through dressings and bandages, you must place airtight material over the chest wound before you dress and bandage the wound.

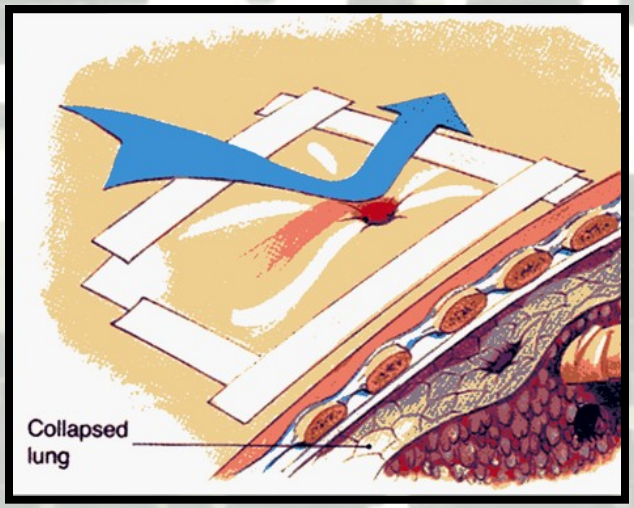
Plastic from a field dressing is one source of airtight material

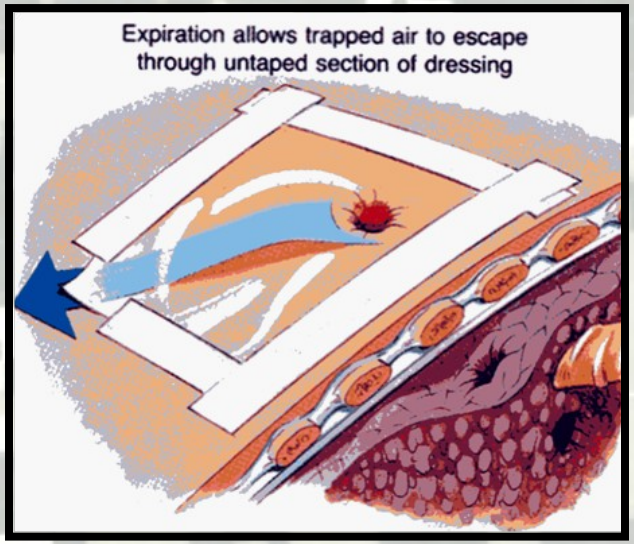
Occlusive Dressing

- **place inside surface of plastic wrapper directly over the hole when casualty exhales**
- **ensure airtight material extends at least two inches beyond the edges of the wound**

Occlusive Dressing

- tape down three edges of airtight material to create an airtight seal to prevent air from entering the chest cavity
- tell the casualty to resume normal breathing
- dress and bandage the wound to protect the airtight material from damage and protect the wound





Occlusive Dressing

- **place the casualty in the recovery position with the injured side to the ground**
- **if the casualty is conscious and wants to sit upright, allow him to sit with his back against a tree or other supporting object**

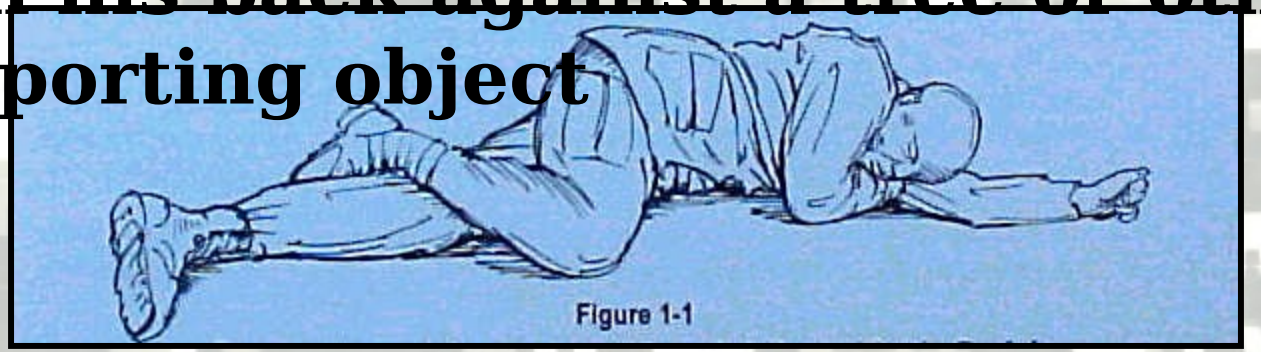


Figure 1-1

Sucking Chest Wound

Tension Pneumothorax

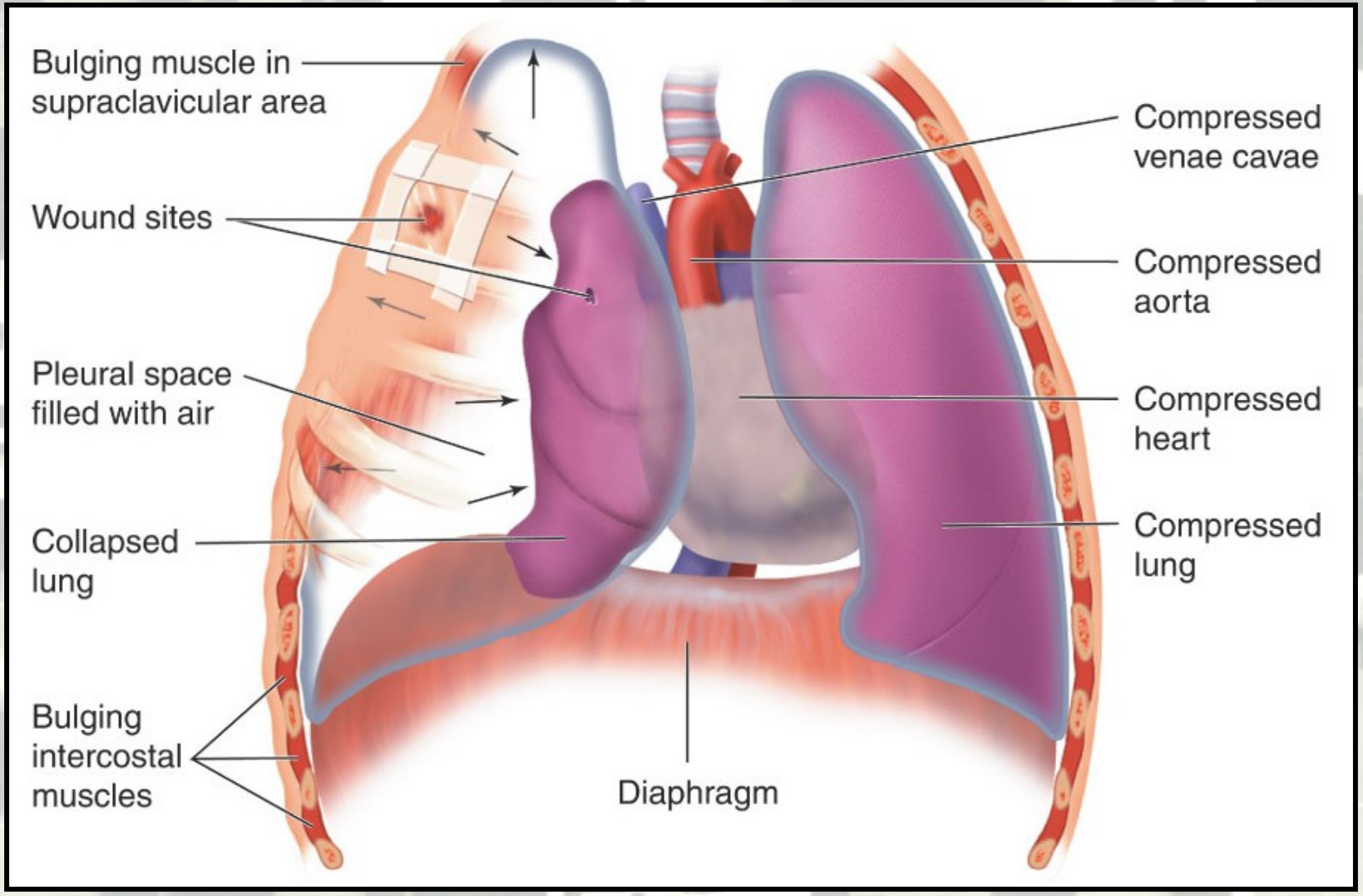
- a tension pneumothorax is a life-threatening condition that results from a progressive deterioration and worsening of a simple pneumothorax

- upon inspiration, when the pressure inside the chest and pleural cavity lessens as a result of the respiratory muscles increasing chest dimensions, air is sucked in through this one way valve, into the pleural space

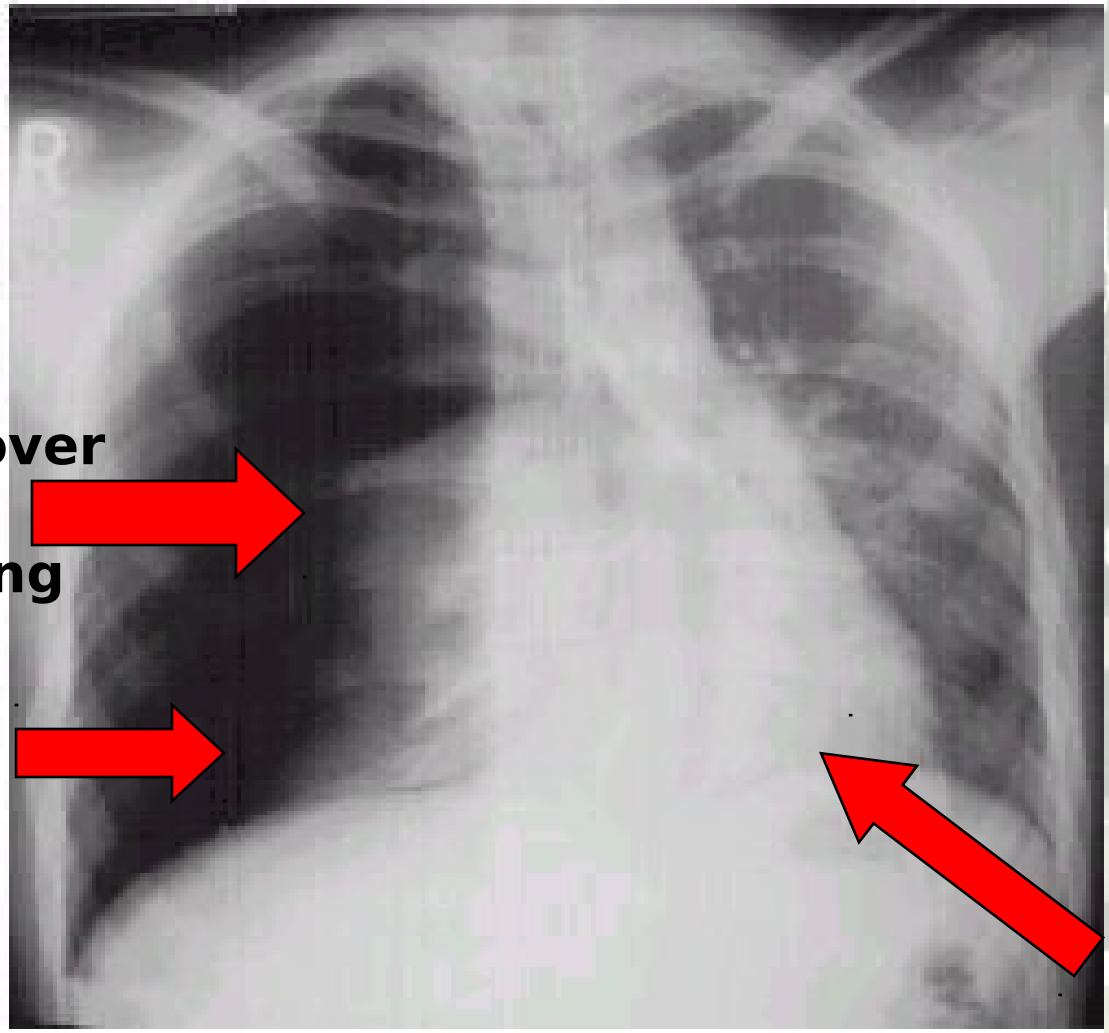
Tension Pneumothorax

Because exhalation is a passive process, there is an insignificant amount of pressure created to force the air back out of the pleural cavity. This condition over time results in a gradual accumulation of air to the degree that it begins to put pressure on the mediastinum, compressing the heart and decreasing cardiac output

Tension Pneumothorax



Tension Pneumothorax



Air pushes over heart and collapses lung

Air outside lung from wound

Heart compressed not able to pump well

Signs and Symptoms of Tension Pneumothorax

- increasing difficulty breathing
- anxiety, agitation, and apprehension
- diminished or absent breath sounds
- cyanosis
- rapid shallow breathing
- distended neck veins

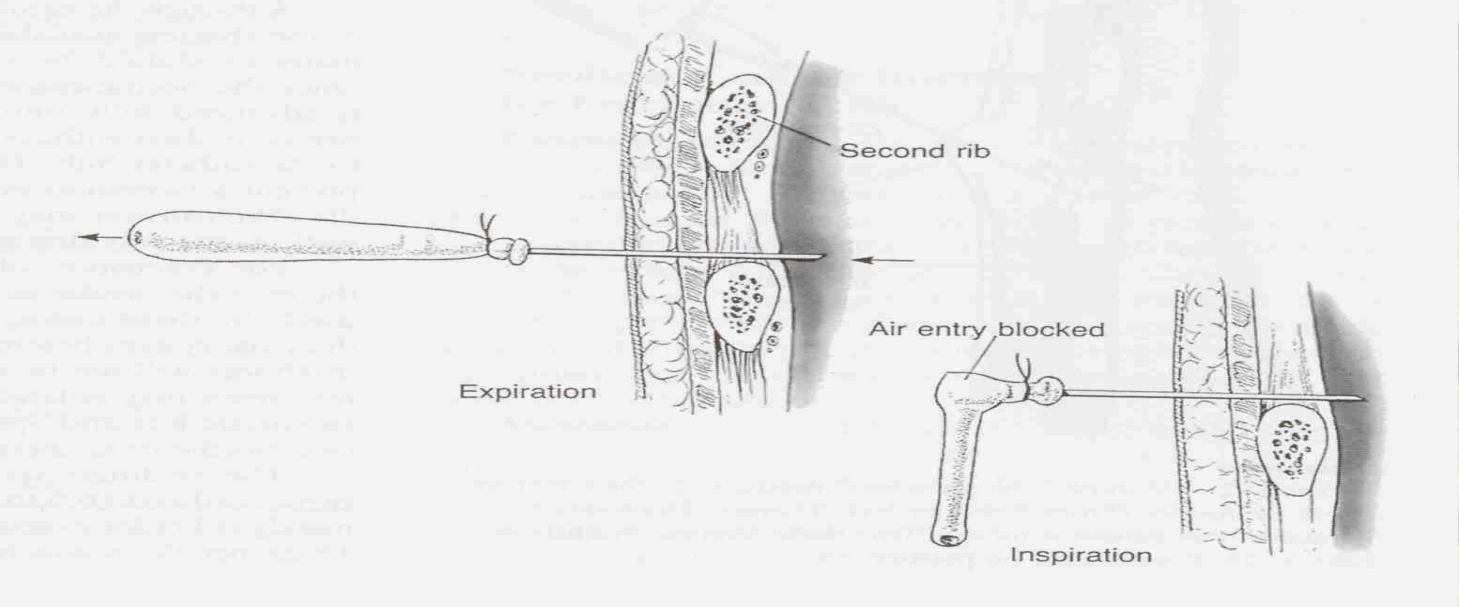
Signs and Symptoms of Tension Pneumothorax

- abnormally low blood pressure (loss of radial pulse)
- cool, clammy skin
- decreased level of consciousness (AVPU)
- visible deterioration of casualty's condition
- tracheal deviation (shift of wind pipe)

**Tracheal deviation is a late sign of tension pneumothorax and will probably not be observed **

Needle Chest Decompression

The buildup of trapped air in the casualty's chest can be relieved by puncturing the air pocket with a needle and catheter unit and allowing the trapped air to escape



Needle Chest Decompression

A needle chest decompression is performed ONLY if the casualty has a penetrating wound to the chest and has increased difficulty breathing

Performing a Needle Chest Decompression

Obtain a large bore (14 ga) needle and catheter unit and strip of tape from your aid bag

Performing a Needle Chest Decompression

Locate the insertion site: The second intercostal space just above the third rib at the mid-clavicular line (injury side)

Performing a Needle Chest Decompression

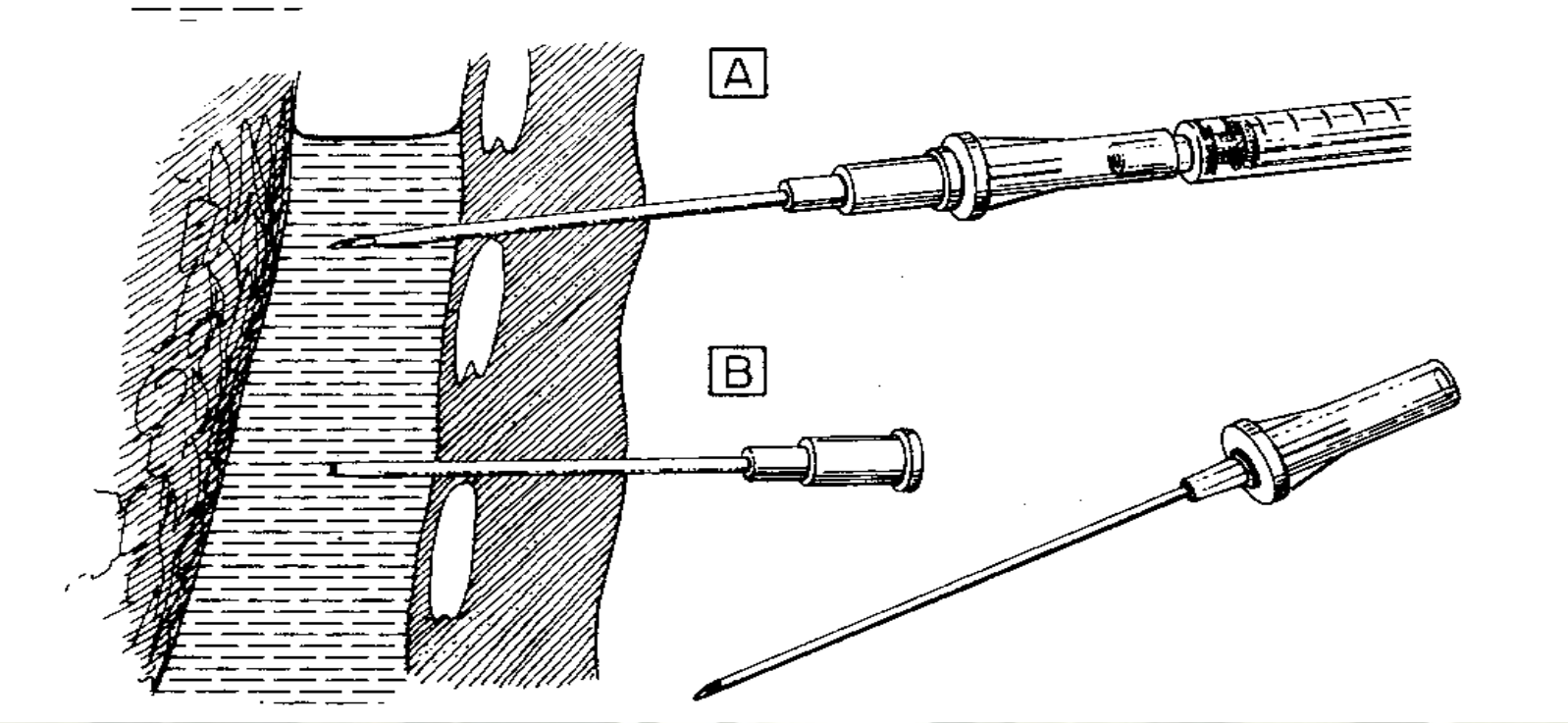
Firmly insert the needle into the skin at a 90 degree angle to the floor or ground

Performing a Needle Chest Decompression

- **insert the needle until the chest cavity is penetrated**
- **you will feel a “pop” as the needle enters the chest cavity**

Performing a Needle Chest Decompression

Withdraw the needle while holding the catheter in place



Performing a Needle Chest Decompression

Use the strip of tape to secure the catheter hub to the chest wall

Additional Care

- **if possible, monitor the casualty until medical care arrives.**
- **when the casualty is evacuated, he can be positioned on his side with the injured side up (opposite of open chest wound without needle decompression.**
- **place the casualty in a sitting-up position if he finds that position more comfortable.**

Performing a Needle Chest Decompression

Impaled Object

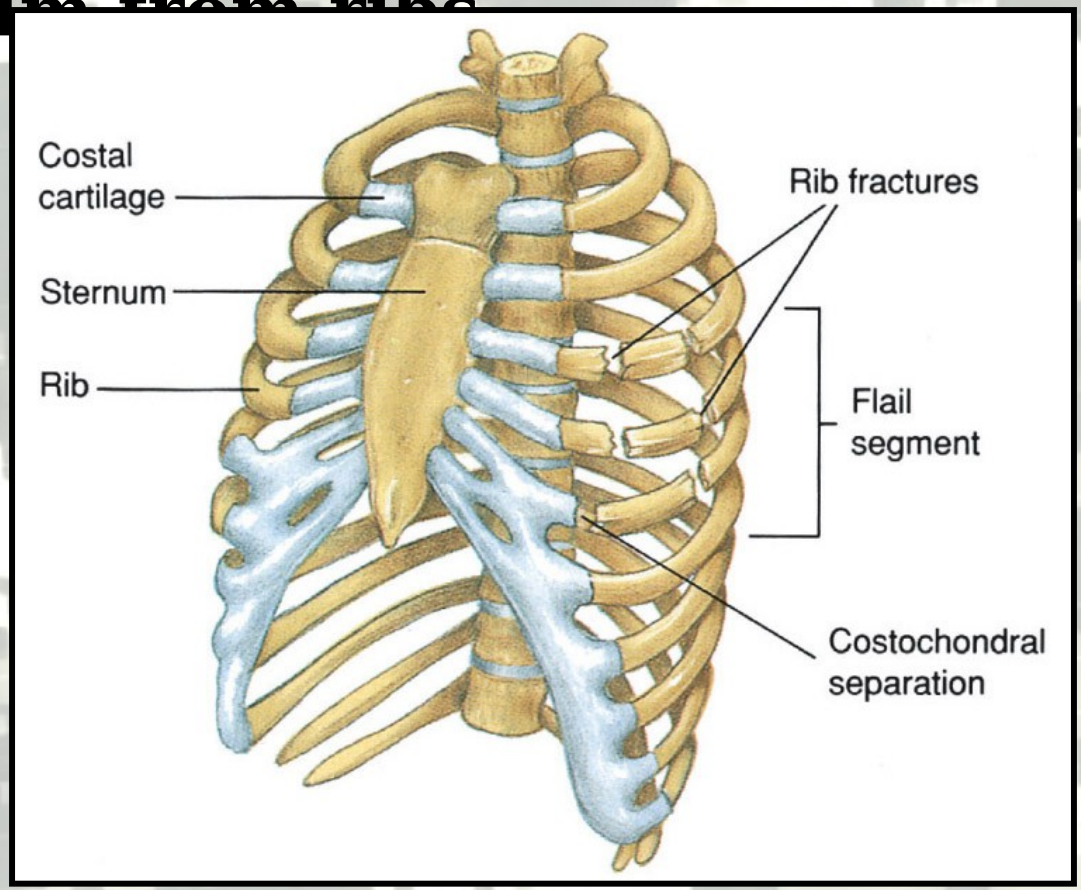
Impaled Object

- **if the casualty is unconscious or cannot hold his breath, place the airtight material over the wound after the chest falls but before it rises**

- **if the casualty is conscious and wants to sit upright, allow him to sit with his back against a tree or other supporting object**

Flail Chest

Two or more adjacent ribs are fractured in at least two places or separation of sternum from ribs



Flail Chest

- incidence
  - Most common cause: vehicular crash
  - Falls from heights
  - Assault
- treatment
  - Cover with a large bulky dressing
- possible closed chest injury **Monitor patients breathing**

Check On Learning

CHECK ON LEARNING

- A soldier has suffered a wound to the chest. You are not sure if the chest wall has been penetrated. What should you do?

  Apply airtight material over the wound and tape down three sides of the occlusive material, then dress and bandage the wound

- A casualty who has a catheter from a needle chest decompression is being evacuated. How should the casualty be positioned on the litter?

  On the uninjured side (the side without the catheter)

CHECK ON LEARNING

- What are signs and symptoms of a tension pneumothorax?

  Labored breathing, nail beds of fingers become bluish; the casualty becomes agitated; the veins in the casualty's neck appear to be swollen (distended).

- The insertion site to relieve tension pneumothorax is located along the casualty's mid-clavicular line. What else is located on or near this imaginary line?

  The nipple

QUESTIONS?